WHAT IS CLAIMED IS:

1. A metallic substrate having a deformable vitreous coating, obtainable by applying an alkali metal silicate-containing coating sol to the substrate and thermally densifying the layer thus obtained in a two-stage heat treatment process, the heat treatment being carried out, in the first stage, either (A) in an oxygen-containing atmosphere or (B) in a vacuum at a residual pressure of ≤ 15 mbar and, in the second stage, in a low-oxygen atmosphere up to full densification with formation of a vitreous layer.

2. The metallic substrate having a deformable vitreous coating as claimed in claim 1, characterized in that the first heat treatment stage is carried out at an end temperature up to about 400°C in variant (A), and at an end temperature up to about 500°C in variant (B).

3. The metallic substrate having a deformable vitreous coating as claimed in claim 1 or 2, characterized in that the second heat treatment stage is carried out at an end temperature in the range from 400 to 600°C.

4. The metallic substrate having a deformable vitreous coating as claimed in one of claims 1 to 3, characterized in that the second heat treatment stage is carried out in an inert gas atmosphere.

5. The metallic substrate having a deformable vitreous coating as claimed in one of claims 1 to 4, characterized in that the cooling phase of the heat-treated substrate is carried out in an oxygen-containing or low-oxygen atmosphere.

6. The metallic substrate having a deformable vitreous coating as claimed in one of claims 1 to 5, characterized in that the alkali metal silicate-containing coating sol is obtainable by a process comprising the hydrolysis and polycondensation of one or more silanes of the general formula (I)

$$R_nSiX_{4-n} \quad (I)$$

in which the X groups, identically or differently from one another, are hydrolyzable groups or hydroxyl groups, the R radicals, identically or differently from one another, are hydrogen, alkyl, alkenyl and alkynyl groups having up to 4 carbon atoms and aryl, aralkyl and alkaryl groups having from 6 to 10 carbon atoms, and n is 0, 1 or 2, with the proviso that at least one silane where n = 1 or 2 is used, or oligomers derived therefrom,

in the presence of

a) at least one compound from the group of the oxides and hydroxides of the alkali metals and alkaline earth metals and optionally

b) added nanoscale SiO_2 particles.

7. The metallic substrate having a deformable vitreous coating as claimed in claim 6, characterized in that the alkali metal oxide or alkaline earth metal oxide or alkali metal hydroxide or alkaline earth metal hydroxide is used in such an amount that the Si:alkali metal or alkaline earth metal atomic ratio is in the range from 20:1 to 7:1, in particular from 15:1 to 10:1.

8. The metallic substrate having a deformable vitreous coating as claimed in claim 6, characterized in that the average value of n in the starting silanes of the general formula (I) is from 0.2 to 1.5, in particular from 0.5 to 1.0.

9. The metallic substrate having a deformable vitreous coating as claimed in one of claims 1 to 8, characterized in that the coating has a layer thickness of from 1 to 6 µm, preferably from 1.5 to 5 µm and in particular from 2.5 to 4.5 µm.

10. The metallic substrate having a deformable vitreous coating as claimed in one of the preceding claims, characterized in that it has been subjected to cold deformation.